प्रोस्थेटिक्स एवं ऑर्थोटिक्स विभाग

Department of Prosthetics and Orthotics

पैरामेडिकल एवं रिहैबिलीटेशन साइन्सेज संकाय

Faculty of Paramedical & Rehabilitation Sciences

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Dr. Shakuntala Misra National Rehabilitation University

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12-14

1st INTERNAL ASSESMENT, 2025

Course Name: - BPO | **Semester:- 2nd year**

Paper Name: - Biomechanics II | **Paper Code:- 204**

Time - 1 Hr. per hour extra time 20 min for V.I. & examinees with writer. | **Max Marks - 20**

Instructions:

The question paper consists of three sections namely 1,2,3 All sections are compulsory.

Section 1- Each question carries 1 mark. All questions are compulsory.

Section 2 - Answer any 2 out of 3 given questions in maximum three hundred (120) words. Each question carries 4 marks.

Section 3 - Answer any 1 out of 2 given questions in maximum one hundred fifty (250) words. Each question carries 8 marks.

A. MCQs: **(4 X 1 marks each = 04 marks)** 2

i. Development of force by increased intramuscular tension without any change in length of the muscle is known as .....

i. Isotonic Contraction
c. Isometric Contraction
ii. Concentric Contraction
d. Eccentric Contraction

ii. The ..... suspension provides rotational stability & a significant degree of medio-lateral pelvic stability.

a. Shoulder Suspenders
c. Cuff Suspension
b. Hip joint with Pelvic band & Belt
d. TES Belt

iii. At the time of Pre Swing Phase the foot acts as a ..... order lever system.

a. First b. Second c. Third d. None of these

iv. ..... is a result of the trans-femoral prosthetic socket not being positioned in an appropriate position of initial flexion.

a. Abducted Gait
c. Uneven Heel Rise
b. Excessive Lumbar Lordosis
d. Vaulting

main

B. Write Short notes: (Answer any Two) **(2 X 4 marks each = 08 marks)**

i. Briefly discuss about the shifting of GRF vector from Weight Acceptance Phase to SLS Phase of Gait Cycle with a neat line diagram.

ii. Briefly discuss about the biomechanical consideration of different socket design in case of Through Knee Amputation

iii. Lever

C. Long Questions (Answer any One) **(1 X 8 marks each = 08 marks)**

i. Briefly describe about the different socket design consideration in case of Transfemoral Amputation. Discuss about the modification/rectification of different walls of Quadrilateral Socket considering biomechanical implications and its advantages.

ii. Discuss about biomechanics of KAFO & HKAFO and elaborate about application of three/four/five-point force system.

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12-15

2nd INTERNAL ASSESMENT, 2025

Course Name: - BPO
Paper Name: - Biomechanics II
Time - 1 Hr. per hour extra time 20 min for V.I. & examinees with writer.

Semester:- 2nd year
Paper Code:- 204
Max Marks - 20

Instructions:

The question paper consists of three sections namely 1,2,3 All sections are compulsory.
Section 1- Each question carries 1 mark. All questions are compulsory.
Section 2 - Answer any 2 out of 3 given questions in maximum three hundred (120) words. Each question carries 4 marks.
Section 3 - Answer any 1 out of 2 given questions in maximum one hundred fifty (250) words. Each question carries 8 marks.

A. MCQs: **(4 X 1 marks each = 04 marks)** 2

i. Which of the following knee joints in a KAFO allows controlled knee flexion during swing phase while locking during stance?

a. Drop lock knee joint
b. Offset knee joint
c. Free motion knee joint
d. Stance control orthotic knee joint

ii. The primary muscles responsible for forward propulsion during terminal stance are:

a. Dorsi Flexors
b. Plantar Flexors
c. Quadriceps
d. Hamstring

iii. In a second-class lever:

a. The effort is between the fulcrum and the load
b. The fulcrum is between the effort and the load
c. The load is between the fulcrum and the effort
d. None of the Above

iv. Which muscle group is specifically targeted for stabilization in the Marlo Anatomical Socket (MAS) design?

a. Hip Adductors
b. Hip Abductors
c. Quadriceps
d. Hamstring

A. Write Short notes: (Answer any Two) **(2 X 4 marks each = 08 marks)**

i. Determinants of Gait 3

ii. Briefly discuss about the biomechanical implication to be considered during construction of different walls of Quadrilateral TF socket.

iii. Biomechanics of Floor Reaction Orthosis 2.5 6

B. Long Questions (Answer any One) **(1 X 8 marks each = 08 marks)**

i. Write down about general features of Gait & its phases with neat line diagram. Briefly elaborate about different gait deviation in case of using transtibial prosthesis.

ii. Describe about the different socket design to be considered depending upon the type of through knee amputation and shape, size & condition of the stump. Briefly elaborate about the biomechanics of the different socket design used in case of Through Knee Prosthesis.